

综述与评论

## 分层Dirichlet过程及其应用综述

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### 摘要

Dirichlet过程是一种应用于非参数贝叶斯模型中的随机过程, 特别是作为先验分布应用在概率图模型中. 与传统的参数模型相比, Dirichlet过程的应用更加广泛且模型更加灵活, 特别是应用于聚类问题时, 该过程能够自动确定聚类数目和生成聚类中心的分布参数. 因此, 近年来, 在理论和应用上均得到了迅速的发展, 引起越来越多的关注. 本文首先介绍Dirichlet过程, 而后描述了以Dirichlet过程为先验分布的Dirichlet过程混合模型及其应用, 接着概述分层Dirichlet过程及其在相关算法构造中的应用, 最后对分层Dirichlet过程的理论和应用进行了总结, 并对未来的发展方向作了探讨.

**关键词** [Dirichlet过程](#) [概率图模型](#) [聚类](#) [分层Dirichlet过程](#)

分类号

## Hierarchical Dirichlet Processes and Their Applications: A Survey

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### Abstract

Dirichlet processes are a type of stochastic processes widely used in nonparametric Bayesian models, especially in research that involves probabilistic graphical models. Over the past few years, significant effort has been made in the study of such processes, mainly due to their modeling flexibility and wide applicability. For instance, Dirichlet processes are capable of learning the number of clusters as well as the corresponding parameters of each cluster whereas other clustering or classification models usually are not able to. In this survey, we first introduce the definitions of Dirichlet processes. We then present Dirichlet process mixture models and their applications, and discuss in detail hierarchical Dirichlet processes (HDP), their roles in constructing other models, and examples of related applications in many important fields. Finally, we summarize recent developments in the study and applications of hierarchical Dirichlet processes and offer our remarks on future research.

**Key words** [Dirichlet processes](#) [probabilistic graphical models](#) [clustering](#) [hierarchical Dirichlet processes \(HDP\)](#)

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